

The Efficiency of Providing Animal Protein from Fish as Supplementary Feeding for Toddlers with Stunting

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Abstract

Given its many benefits over other animal products as a source of protein, salmon is a very suitable source of animal protein to help initiatives that aim to enhance community nutrition and combat stunting. To keep Indonesia from losing its golden generation in the future, stunting must be treated appropriately. The aim of this study was to evaluate the impact of supplemental fish-based diet on the nutritional status of stunting toddlers. The sample in this study consisted of 26 stunted toddlers receiving fish-based supplementary feeding (PMT) for 90 days from September to December 2022 at the Simpang Periuk Health Center work area. An experimental design with a pre- and post-test strategy without control was used in this study's methodology. By contrasting the nutritional status of toddlers before and after the intervention, a paired sample test was utilized as the statistical analysis. December 2022 saw the completion of this study. The findings indicated that there were significant differences in the nutritional status of toddlers before and after receiving the intervention, with a p-value of 0.000 (.05) indicating that this was the case. It can therefore be deduced that providing fish-based PMT interventions for 90 days can improve toddlers' nutritional status, lowering the rate of stunting in the target toddlers.

A. Introduction

One of the four goals for health development in the 2020–2024 National Medium-Term Development Plan (RPJMN) is the development of top-notch human resources. The nutritional status of toddlers and pregnant women is one of the key factors affecting the efficacy of human resource development. One of the fundamental needs of young children is health and nutrition, which must be met in order for them to grow and develop as best they can for their age group. Attention (Nugroho et al., 2021). Stunting can be a sign of low human resource quality, which has an impact on a country's productivity and economic growth, therefore its prevention and control are crucial. Stunting is a disorder in which a child's body and brain fail to develop normally, resulting in stunting. As a result, the child has delayed thinking and is shorter or of shorter stature than other kids their age. Typically brought on by food intake that is out of balance with nutritional requirements.

The quality of the protein consumed by Indonesians can be evaluated using changes in the intake of animal protein. These changes can also be utilized to further nutritional research and determine the elasticity of demand for animal food products. One of the causes of Indonesia's population's poor nutritional state is a lack of protein, which over time will have an effect on the nation's lower level of human resources (Umaroh & Vinantia, 2018). Consuming protein affects one aspect of nutritional status (Sutrio & Mulyani, 2020).

One of the reasons for malnutrition in Indonesia is a lack of protein intake and dietary alterations (Setiawan, 2006).

The Ministry of Maritime Affairs and Fisheries is directed by Presidential Instruction (INPRES) No. 1 of 2017 to establish the Healthy Living Community Movement (GERMAS) as one of the initiatives to address stunting cases in Indonesia while also introducing the Fish-Eating Popularization Movement (GEMARIKAN). GEMARIKAN (Movement to Popularize Eating Fish) is a moral movement to be able to motivate the public at large to consume fish regularly in the amounts required for health in order to form healthy, intelligent and strong human beings (Tisngati & Genarsih, 2022). Given its many benefits over other animal products as a source of protein, salmon is a very suitable source of animal protein to help initiatives that aim to enhance community nutrition and combat stunting. To avoid losing Indonesia's next golden generation, stunting must be appropriately managed (Hartaty et al., 2020). Fish is one of the items that can be a wonderful and affordable source of nourishment. Protein and fatty acids included in fish meat are beneficial to children's health and intelligence (Sidiq et al., 2022).

Efforts to reduce stunting require nutrition interventions that are carried out in an integrated and integrated manner, including specific and sensitive nutrition interventions (Nugroho et al., 2023). Providing extra food and educating parents are two methods for ensuring that young children receive the proper nutritional intake. The nutritional quality of young children can be improved by giving them extra food in the form of snacks that don't contain fish. Several studies have added snakehead fish meal to snacks to create additional food. The findings of studies on biscuits indicate that substituting fish meal can improve the protein value of biscuits. According to Nadimin's research findings from 2022, supplementing stunted toddlers' diets with PMT-Tibus, a meal made from snakehead fish flour, along with online nutrition education, can enhance their BB/U and BB/TB nutritional status (Nadimin, 2022).

According to the 2022 Indonesian Nutrition Status Study's (SSGI) findings, 11.7% of children under the age of five in Lubuklinggau City had stunting. Stunting rates have been reduced by a variety of intervention strategies, one of which is the Lubuklinggau City Fisheries Service's provision of fish-based supplementary feeding (PMT). This study intends to evaluate the efficacy of supplementing the diets of stunting toddlers in Lubuklinggau City with fish-based foods.

B. Research Methods

In this work, an experimental research methodology using a single group pretest and posttest design method was used. There are 26 toddlers with stunting in the Simpang Periuk Lubuklinggau Health Center's testing region. The first test variable examined the nutritional condition of stunting toddlers (TB/U) before the intervention was administered, and the intervention was subsequently administered in the form of fish-based supplementary meal (PMT) with preset nutritional values for 90 days. The research was carried out between September and December of 2022. The toddlers' nutritional status (TB/U) at the conclusion of the intervention was measured after 90 days as a final test. The effectiveness of the given intervention program was then determined using a paired sample T test. September 2022 through December 2022 is when implementation will begin.

C. Result and Discussion

The intervention was given to 26 targeted under-five samples in the form of fish-based PMT which had been analyzed for the nutritional value of the serving using the Nutrisurvey application by the Indonesian Nutritionists Professional Organization (PERSAGI) DPC Lubuklinggau City with the nutritional content values as follows:

Table 1. Nutritional Value of Fish-Based Supplementary Feeding

Nutritional Value	
Calorie	209 Kal
Fat	7,94 gr
Protein	9,83 gr
Carbohydrate	24,04 gr

The PMT intervention product is in the form of additional processed fish food as a complementary food for stunting toddlers with a variety of menus: dimsum, meatballs, pempek, tekwan, nuget, sempol and otak-otak as can be seen in the following figure:



Figure 1. Provision of Fish-Based Supplementary Food

This PMT is given every day for 90 consecutive days which is carried out by posyandu cadres assisted by nutrition officers at the health center and supervised by officers from the Lubuklinggau City Fisheries Office on a regular basis. The following are PMT distribution activities for targets in the field:



Figure 2. Distribution of Supplementary Food to Target Toddlers

1. Results of Developmental Nutritional Status of Target Toddlers

Measurement of the nutritional status of children under five was carried out before, during and after the provision of fish-based PMT interventions. The following is a picture and table of the results of measuring

the nutritional status of toddlers which were carried out in September, October, November and December 2022:

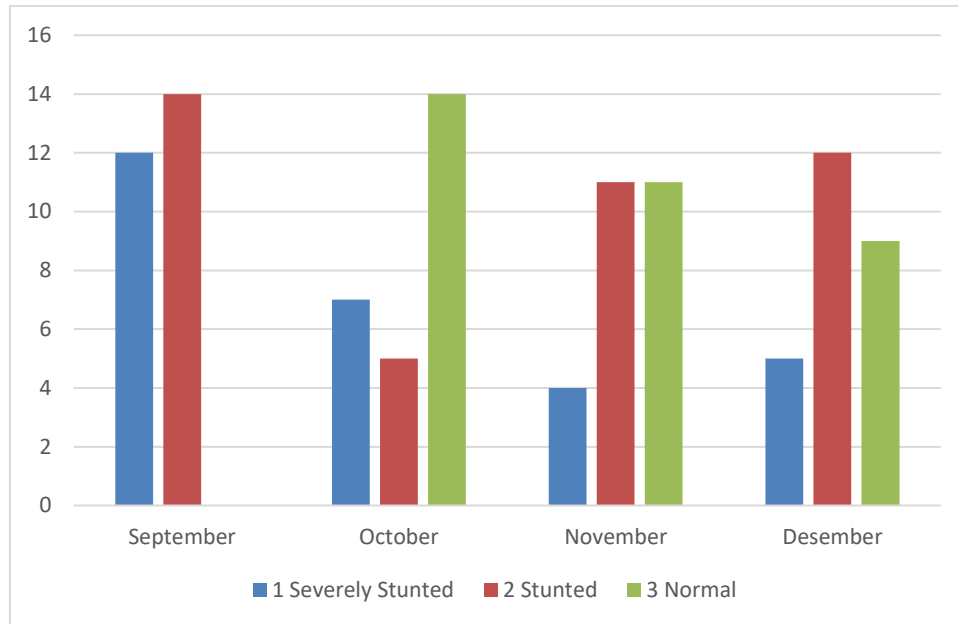


Figure 3. Graph of Target Toddlers Nutritional Status Measurement Results During Intervention

Measuring nutritional status is carried out by nutrition officers and posyandu cadres during weighing activities, but if toddlers are not present at the posyandu, nutrition officers and cadres will visit toddlers' homes to measure the target nutritional status of toddlers.

Table 2. Results and Percentage of Target Toddler Nutritional Status Measurement During Intervention

No	Nutritional Status	Nutritional Status Measurement Month			
		September	October	November	Desember
1	Severely Stunted	12 (46,1%)	7 (27%)	4 (15,3%)	5 (19,2%)
2	Stunted	14 (53,8%)	5 (19%)	11 (42,3%)	12 (46,1%)
3	Normal	-	14 (54%)	11 (42,3%)	9 (34,6%)
	Amount	26 (100%)	26 (100%)	26 (100%)	26 (100%)

In the early stages, before being given PMT, it was known that of the 26 targeted toddlers, 12 toddlers (46.1%) had severely stunted nutritional status and 14 toddlers (53.8%) were stunted. After being given an intervention in the form of fish-based PMT for 90 days, then anthropometric measurements were taken in the form of toddler's weight and height. The final result of giving PMT is that the number of toddlers with severely stunted nutritional status is 5 toddlers (19.2%), toddlers with stunted nutritional status are 12 toddlers (46.1%) and those with normal nutritional status are 9 toddlers (34.61%).

2. Statistical Test Results

After data on nutritional status before and after the intervention was collected, data analysis was then carried out using the SPSS Version 22 application with the Paired Sample T Test with the following results:

Table 3. Data Distribution

	Mean	N	Std Deviation	Std Error Mean
Before	75.3654	26	4.65738	.91339
After	76.1115	26	4.59211	.90059

From the table above it is known that the number of samples before and after the intervention was N = 26 each with a median height (mean height) before the intervention of 75.3654 cm and after the intervention of 76.115 cm. The standard deviation before the intervention was 4.65738 and after the intervention was

4.59211. The mean standard error before the intervention was 0.91339 and after the intervention was 0.90059.

Table 4. Product Moment Correlation Test

	N	Correlation	Sg
Before& After	26	.982	.000

From the results of the product moment correlation test, it is known that a significance value of $0.00 \leq 0.05$ means that there is a relationship between height before the intervention and after the intervention in toddlers after being given an intervention in the form of PMT made from fish.

Table 5. Paired Sample T Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std Deviation	Std Error Mean	95% ConfidenceInterval of the Difference				
				Lower	Upper			
Before - After	-.74615	.87829	.17225	-1.10090	-.39141	-4.332	25	.000

From the results of the statistical test table above, it can be interpreted as follows:

1. It is known that the significance value = $0.000 \leq 0.05$, so there is a significant difference in toddlers' height before and after the intervention is given, so it can also be concluded that giving fish-based PMT interventions for 90 days can increase toddlers' height thereby reducing the number stunting in the target toddler.
2. T count = -4.332 < t table 2.060, so statistically there is a difference in height between before and after being given fish-based PMT intervention for 90 days in the target toddlers.

The children under five who were the subject of this study were not only stunted but also suffered from malnutrition and other infectious diseases. Stunting is a condition of impaired growth in height that occurs due to malnutrition in the past, especially during the golden age period, namely the first 1000 days of life (1000-HPK). Growth disturbances in the past have affected posture and muscle, fat and tissue mass at present, so that stunted children also tend to have lower body weight (Richard et al., 2012).

According to the findings of this study, after receiving special interventions in the form of PMT manufactured from fish for 90 days, the nutritional condition of toddlers with stunting improved. This demonstrates that feeding stunted toddlers nutritious food is the most efficient way to lower the prevalence of stunting. According to earlier study by Jati and Nindya, moms under the age of five should consume more energy, protein, and zinc to prevent stunting and promote healthy growth and development. Apart from causing poor nutritional status, energy intake is also related to the level of development of stunted children. Toddlers with stunting have a lower developmental level compared to children who have normal nutritional status (Adani, F. Y. and Nindya, 2017).

Children in Indonesia still eat less protein than is desirable, which may contribute to the high prevalence of stunting (Sjarif et al., 2019). Nutrient deficiency is a cumulative process that results in stunting (Ayuningtyas, A., Simbolon, D. and Rizal, 2018). Consumption of macronutrients is one of the factors that contributes to the prevalence of stunting in toddlers. Macronutrient consumption and the prevalence of stunting in young infants are strongly correlated, according to Tangkudung's earlier research findings. (Tangkudung, 2014). Provision of information and education to the public to consume food sources of animal protein in a more varied way can improve the nutritional status of stunting toddlers (Ernawati et al., 2017).

Due to budgetary restrictions, not all toddlers in Lubuklinggau City who experience stunting can receive the intervention in its totality in all puskesmas working locations. This is one of the study's limitations.

D. Conclusion

Given that the results of a statistical test with a significance level of $0.00 \leq 0.05$ show a significant difference in the target toddler's height between before and after receiving the intervention, it can be concluded that

providing fish-based PMT interventions for 90 days is very effective in increasing toddler height and lowering the rate of stunting. Given the aforementioned facts, it is clear that giving toddlers fish-based PMT for 90 days is one of the most successful intervention programs to lower stunting rates.

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References

- Adani, F. Y. and Nindya, T. S. (2017). Perbedaan Asupan Energi , Protein , Zink , dan Perkembangan pada Balita Stunting dan non Stunting. *Amerta Nutrition*, 46–51. <https://doi.org/doi:10.20473/amnt.v1.i2.2017.46-51>
- Ayuningtyas, A., Simbolon, D. and Rizal, A. (2018). Asupan Zat Gizi Makro dan Mikro terhadap Kejadian Stunting pada Balita. *Jurnal Kesehatan*, 9(3), 445. <https://doi.org/10.26630/jk.v9i3.960>
- Ernawati, F., Prihatini, M., & Yuriesta, A. (2017). Gambaran Konsumsi Protein Nabati Dan Hewani Pada Anak Balita Stunting Dan Gizi Kurang Di Indonesia (the Profile of Vegetable - Animal Protein Consumption of Stunting and Underweight Children Under Five Years Old in Indonesia). *Penelitian Gizi dan Makanan (The Journal of Nutrition and Food Research)*, 39(2), 95–102. <https://doi.org/10.22435/pgm.v39i2.6973.95-102>
- Hartaty, N., & Yuswardi. (2020). Pengetahuan Keluarga Tentang “Gemarikan” Dalam Pencegahan Stunting Di Kota Banda Aceh. *Idea Nursing Journal*, 11(1), 55–59. <https://doi.org/10.52199/inj.v11i1.19796>
- Nadimin. (2022). Pemberian makanan tambahan substitusi tepung ikan gabus (PMT- tibus) dalam meningkatkan status gizi anak balita Provision of supplementary food substitution of snakehead fish meal improves the nutritional status of toddlers Abstrak Pendahuluan Metode. *AcTion: Aceh Nutrition Journal*, 7(1), 61–68. <https://doi.org/DOI:10.30867/action.v7i1.613>
- Nugroho, M. R., Armeidi, E., & Husmi, F. (2023). Balanced Nutritious Staple Foods as Spesific Interventions for Stunting Children. *Jurnal Ilmiah Pengabdian Masyarakat Bidang Kesehatan (Abdigermas)*, 1(1), 24–29. <https://doi.org/10.58723/abdigermas.v1i1.11>
- Nugroho, M. R., Sasongko, R. N., & Kristiawan, M. (2021). Faktor-faktor yang Mempengaruhi Kejadian Stunting pada Anak Usia Dini di Indonesia. *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini*, 5(2), 2269–2276. <https://doi.org/10.31004/obsesi.v5i2.1169>
- Richard, S. A., Black, R. E., Gilman, R. H., Guerrant, R. L., Kang, G., Lanata, C. F., Mølbaek, K., Rasmussen, Z. A., Sack, R. B., Valentiner-Branth, P., Checkley, W., Moore, S. R., Lima, A. A. M., Pinkerton, R. C., Aaby, P., Cabrera, L. Z., Bern, C., Sterling, C. R., Epstein, L. D., ... Verastegui, H. (2012). Wasting is associated with stunting in early childhood. *Journal of Nutrition*, 142(7), 1291–1296. <https://doi.org/10.3945/jn.111.154922>
- Setiawan, N. (2006). Perkembangan Konsumsi Protein Hewani di Indonesia : Analisis Hasil Survey Sosial Ekonomi Nasional 2002-2005. *Jurnal Ilmu Ternak*, 6(1), 68–74. <https://doi.org/https://doi.org/10.24198/jit.v6i1.2270>
- Sidiq, R. S. S., Zulfa, D. N. A., Elvira, E., Alhazra, M. R., Reski, M., Pratama, D. W., Rahmasari, R., Alfianti, N., Rufini, I. A., Indriani, I., Nurmallasari, N., & Sugiyanto, S. (2022). Pengolahan Ikan Patin Sebagai Makanan Tambahan Dalam Pencegahan Stunting. *Lambung Inovasi: Jurnal Pengabdian kepada Masyarakat*, 7(4), 600–608. <https://doi.org/10.36312/linov.v7i4.952>
- Sjarif, D. R., Yulianti, K., & Iskandar, W. J. (2019). Daily consumption of growing-up milk is associated with less stunting among Indonesian toddlers. 28(1), 70–76. <https://doi.org/https://doi.org/10.13181/mji.v28i1.2607>
- Sutrio, S., & Mulyani, R. (2020). Hubungan Pola Konsumsi Ikan dengan Status Gizi Anak Sekolah di Pesisir Teluk Pandan Kabupaten Pesawaran. *Gorontalo Journal of Public Health*, 3(1), 1. <https://doi.org/10.32662/gjph.v3i1.918>
- Tangkudung, G. (2014). Hubungan Antara Asupan Energi dengan Kejadian Stunting pada Anak Usia 13-36 Bulan di Wilayah Kerja Puskesmas Tuminting Kota Manado. *Kesmas*, 00, 5. [Google Scholar](https://scholar.google.com/citations?user=...)
- Umaroh, R., & Vinantia, A. (2018). Analisis Konsumsi Protein Hewani pada Rumah Tangga Indonesia Analysis of Animal Protein Consumption in Indonesia Households. *Jurnal Ekonomi dan Pembangunan Indonesia*, 2019(3), 22–33. <https://doi.org/10.21002/jepi.2018.13>

Tisngati, U., & Genarsih, T. (2022). Edukasi Gemar Ikan: Upaya Peningkatan Kesadaran Dan Kepedulian Sosial Mahasiswa. *Jurnal Pengabdian Kepada Masyarakat*, 02(01), 779–784.
<https://doi.org/https://doi.org/10.47492/eamal.v2i1.1212>

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